

Return to Mr. Bonney

HOUSE OF REPRESENTATIVES

COMMITTEE ON

ARMED SERVICES

In Re: H. R. 5074

DATE: February 20, 1950

VOLUME: 1

CAPITOL REPORTING SERVICE

SAMUEL FRIEDMAN

OFFICIAL REPORTER

631 Pennsylvania Ave., N. W.

Washington 4, D. C.

EXecutive 1851

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HOUSE OF REPRESENTATIVES,
Committee on Armed Services,
Subcommittee No. 3.
Monday, February 20, 1950.

The Subcommittee met at 10 o'clock a.m., the Hon.

Carl T. Durham, presiding.

Mr. Durham. I believe the next bill we have to take up
this morning is H. R. 5074.

(H. R. 5074 is as follows:)

Mr. Durham. Who is here to speak on H. R. 5074? Will you come around and give the Committee Clerk your name and the position you hold at the present time?

STATEMENT OF J. C. HUNSAKER
CHAIRMAN, NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS

Mr. Hunsaker. J. C. Hunsaker. I am the elected chairman for this year of the National Advisory Committee for Aeronautics, and I am speaking on behalf of my sixteen colleagues on that committee. In private life I am the head of the Department of Aeronautical Engineering at the Massachusetts Institute of Technology.

Mr. Durham. Doctor, does your statement carry the full committee members? If not, I wish you would put those in the record at this point.

Mr. Hunsaker. I don't believe it gives their names. It states that there are seventeen members appointed by the President, persons who serve on this committee as such without compensation. ~~but~~ Of those members at the present time ten are from Government offices concerned with aeronautics and seven are independent persons from private life.

Of the ten persons from the Government, there are two generals from the Air Force, including the head of the Air Force, ^{Major} General Vandenberg; two admirals, ^{Vice Admiral I. D. Price and T. A. Loring} representing the interests of naval aviation; and two from civil aeronautics, Department of Commerce, ^{including the director of the} Civil Aeronautics Administration, ^{and one to be appointed to fill a vacancy} Then ex officio

and the director of research and development, Major Gen. Don Pratt;

by the provision of the Act of 1915, there ^{are} ~~is~~ the head of the ^{Dr. F. D. Lewis} Smithsonian Institution, ^{Dr. F. D. Lewis} the head of the Bureau of Standards, ^{Dr. F. D. Lewis} the Head of the Weather Bureau, and ^{after taking the oath of office, then newly appointed} the head of the Research and Development Board, the four scientific agencies in the Government concerned with aeronautics.

~~They~~ Included in the seven independent persons appointed by the President are ~~the President, not ex officio, it happens~~ that one ^{President} is Dr. Bronk, the head of Johns Hopkins University; one ^{T. C.} is Dr. Wright, the Vice-President of Cornell; One is Lieutenant General, retired, Jimmy Doolittle, ^{Company} the Shell Oil ~~industry~~. ^{and} The other is myself a professor at M. I. T., ~~and~~ Then there are three of our colleagues who are intimately concerned with the operation and manufacture ^{of aircraft}, Mr. ^{Arthur} Raymond, who is Vice-President in charge of engineering of the Douglas Aircraft Company, Mr. ^{Ronald} Hazen, who is the chief engineer of Allison Division of General Motors which makes engines, and Mr. ^{William} Littlewood, who is the Vice-President in charge of engineering for American Airlines.

So we have men from aircraft manufacturing, engine manufacturing, and air transport operation. That makes a total of seventeen.

The committee operates under by-laws which have been approved by the President. It employs a Civil Service staff to accomplish its work. It elects its own chairman and appoints its director of research. It operates exactly like the board of directors of a corporation, determining policies and pro-

cedures and hiring the people that it charges with carrying out its policies.

Mr. Durham. In this group, seven from civilian life serve without any compensation; is that correct?

Mr. Hunsaker. That is right.

Mr. Durham. Of course, the others from the military service are on the Government payroll.

Mr. Hunsaker. It is just additional duty for them.

Mr. Durham. Now you may proceed with your statement.

~~I am sorry I bothered you with it.~~

Mr. Hunsaker. ~~I was very glad to get that on the record.~~

The purpose of my coming before you is to speak with regard to H. R. 5074 which is legislation designed to rationalize our practices and procedures that have grown up over the past thirty years, principally with authority from the annual appropriation Acts.

This draft has been approved by the Bureau of the Budget as consistent with the President's policy. In fact my statement, a copy of which will be left with your Clerk, has been submitted to the Bureau of the Budget, and is pronounced by them consistent with their views.

The Act is designed to authorize the equipment, maintenance, and operation of our present facilities, to authorize the construction and equipment that might be appropriated for at present facilities, the purchase and maintenance of cafeteria equipment,

the transfer of certain materials by the Department of Defense to the committee, the employment of aliens when necessary, and to change the name of our laboratory at Cleveland to Lewis Flight Propulsion Laboratory.

That was actually done ~~in speeches made~~ a year or more ago by the committee's own act. We think it would be better and more dignified for the Congress to authorize our use of that name.

The committee, as you, Mr. Chairman, know, is the principal agency of the Government for research in the field of aeronautics. It was set up in 1915 and charged by the Congress with the duty of studying the scientific problems of flight with a view to their practical solution.

It is the business of the committee to prospect frontiers of science and engineering for knowledge which will lead to practical advances in aviation. We conduct fundamental research in the aeronautical sciences. We hope that that research may result in technical data which can be applied by industry in the design and development of new aircraft and equipment, both civil and military.

We cooperate with the military services in the development of applications. The military take on themselves the exploration of possible military applications of research results which have come from our committee's laboratories.

There is a written agreement between the military services,

the Civil Aeronautics Administration, and the aircraft industries that the NACA will conduct certain parts of the research program of the country, and the others will do other parts. This was spelled out in Secretary Stimson's time in order to guide officers against unnecessary duplication or starting new developments or researches without consulting with the others.

Mr. Durham. That agreement still stands today, Doctor?

Mr. Hunsaker. Yes, sir.

Mr. Durham. Is it a lengthy agreement?

Mr. Hunsaker. No, it is a short one of policy, and I would be happy to put it in the record, if you would like to do so.

Mr. Durham. I would like you to put it in the record at this point.

Mr. Hunsaker. I said it was short. It is three and a half pages long, but the intent of it is very short. It merely means that the NACA will do the research and do the exploration and the military services will explore military applications and test and evaluate the new types that may come from it, ~~that is experimental construction of actual things~~, and the industry will apply research data in design to develop aircraft and equipment embodying research.

Mr. Durham. I think it would be helpful to have the whole agreement in the record. If there is no objection, we will put the whole agreement in the record at this point.

(The agreement referred to is as follows:)

Mr. Hunsaker. To discharge its responsibilities our committee is responsible for planning and conducting an adequate program, ~~adequate means of~~ giving cognizance to what we believe the state of the art is, ^{and to} the pressure for advancement on certain military and technical and strategic requirements.

We are affected somewhat by the rate of development of the military programs. We are also affected by the civil aviation experience. If there is serious doubts about the safety of some particular phase of air transport, it comes back to worry us. If air transport is expanding too fast, if there is some doubt about certain all-weather flying, for example, whether we are adequately protected against ice formations in flight, we try to see what scientific research can do ⁱⁿ ~~to~~ these situations that are either actual or foreseen or becoming imminent.

The results of the committee's research are embodied primarily in reports, and these reports containing design data and advice are distributed within the limits of security requirements to the military service and to industry and to air transport operators and to educational institutions and libraries, people who are legitimately concerned.

As I said before, the committee as a whole, these presidential appointees, operate like a board of directors. There is a meeting once a month through the year. It is normally held in Washington, most of the time, but we try to meet at

least once a year at each of the three laboratories that the committee operates, one at Langley Field, Virginia, one for propulsion at Cleveland, Ohio, and one at Ames Laboratory in California near Palo Alto. The committee is meeting at the end of the month at the California laboratory.

In that way we not only show the devoted personnel at the laboratory that someone is interested in them and what they are doing, but we also get an idea as to the tone and morale of the laboratories.

The committee has these three laboratories. I believe the total ^{staff} payroll is about seven thousand men and women which include scientists of top rank on down to mechanics and glass blowers and stenographers and file clerks, the complex~~ness~~ of people that it takes to make up the team to do the work.

I believe that unless you have a question for me, sir, I would like to pass the ball to Dr. Dryden, the Director of Research for the NACA to show a few typical research problems that are illustrative of the way the committee works and its relations with other agencies of the Government.

Mr. Durham. That completes your statement then, does it, Doctor?

Mr. Hunsaker. Yes, sir.

Mr. Durham. Do you have any questions?

Mr. Smart. May I suggest, Mr. Chairman, that unless there is a duplication in Dr. Dryden's remarks that Dr. Hunsaker's

statement be inserted in the record at this point.

Mr. Durham. Very well.

(The statement referred to is as follows:)

Mr. Durham. Mr. Doyle has a question.

Mr. Doyle. Section 3 provides that statutory provisions prohibiting the payment of compensation to aliens shall not apply to any persons whose employment by the committee is determined to be necessary. Under what conditions would you be employing aliens now?

Mr. Hunsaker. We have some now. We have at Langley Field an Italian scientist who in our opinion had knowledge and skill that we needed. ~~to have working for us.~~ We also have one German scientist. They were brought over at the close of the war ~~after~~ prolonged interrogation under special conditions. They want to become Americans and they want to stay with us, and as long as they are good, we would like to have them with us, although they are aliens and will remain so until they become citizens.

Normally under Civil Service ^{a person must} ~~everybody has to~~ be a citizen to work in our laboratories, and in these special cases where an alien appears to be of considerable advantage to employ, we have had authority up to now to employ him, ^{and} ~~but~~ we would like to have this legislation confirm the present language.

Mr. Doyle. Do any of those gentlemen who are aliens have the idea that they have become so valuable that you cannot dispense with their services when it comes to reviewing their contract?

Mr. Hunsaker. I do not believe so, and I am just enough

of a Dutchman to think that if anyone ever got that idea, we would have him out on his ear pretty quickly.

Mr. Doyle. And send him where?

Mr. Hunsaker. If he is still an alien we might send him home. It depends on the conditions under which he is in the United States.

Mr. Doyle. We would send him back then with the knowledge he has gained of our processes and facilities.

Mr. Hunsaker. These former enemy aliens--~~I do not like to think of Canadians as the same source--~~are not turned loose in the whole laboratory. They work on their specific assignments. To some degree they ~~must~~ absorb an idea of how we do things and what we are doing, but not in detail. I would not think that they would carry much with them beyond some experience.

Mr. Doyle. Well, the reason, Mr. Chairman, that I specifically ask that question is to get in the record whatever your answer is on that important point, because it is bound to be asked.

Mr. Hunsaker. Oh, yes. Well, I would like to have it appear in the record that we believe that we are the best in the world and we have among our staff the best people and the most knowledge. On the other hand, we do not have it all, and where there is good reason to believe that certain aliens have had experience in some specialty and we would like to have their

services and the alien appears willing to give his services, we would like to have the authority to employ him strictly as an alien for such time as the committee believes it is to our advantage to do so. It is not a permanent marriage. If these fellows make good and become American citizens and can apply like any other good citizen for a Civil Service job, that is another thing.

Mr. Elston. Are these aliens all given loyalty checks?

Mr. Hunsaker. I don't know about loyalty checks. They ^{were thorough} are given a lot of checks.

Mr. Kelly. They are checked carefully by the military before being certified to permanent admission. In the cases of the two aliens we have, they have been admitted as immigrants after thorough checking by the military and State Department, and they have applied for citizenship. They have made their declaration commonly called "first papers."

Mr. Hunsaker. ^{There} ~~This~~ is a clearance investigation of them and their parents and grandparents and the risk in connection with them.

Mr. Doyle. Do they bring their families with them?

Mr. Hunsaker. After a couple of years arrangements are made to bring their families. We would rather have the families over here, too, and make a clean break with the past.

Mr. Kelly. Both of them have families. As of yesterday the second family was brought in as immigrants.

Mr. Hunsaker. They got immigrant visas.

Mr. Kelly. Yes, yesterday at Niagara Falls.

Mr. Elston. Do you rely on a military check as well as on the State Department?

Mr. Hunsaker. I do not think it is the State Department. I think it is the military. The military people found these men and interrogated them.

May I state something off the record?

Mr. Durham. Yes.

(Remarks off the record.)

Mr. Elston. I would like to ask how have you been able to pay these aliens in the past if there has been prohibition against it.

Mr. Victory. We have had authority in the appropriation Acts every year and it is to obviate that necessity every year that this question is before you now.

Mr. Smart. I would like to point out that the basic reason for this bill being here is the fact that since the creation of NACA in 1915 they have never had basic authorization legislation.

Mr. Durham. They had \$165,000,000 last year authorized by this Committee.

Mr. Smart. That is true, but that was on a specific project and over a period of thirty years. All of their authorization has been purely in appropriation language.

As a consequence, in the report of the Appropriations Committee on the independent offices appropriation bill for fiscal 1950 the Appropriations Committee made this statement:

"The Committee is of the opinion that an agency which has grown to the size and importance attained by NACA should have broad basic legislation authorizing all functions, including authorization for the construction of specific projects.

"This latter situation has not existed in connection with NACA. The Committee was informed that all authorizations for constructions have been in the form of appropriations recommended by the Appropriations Committee and approved by the Congress without prior consideration by the appropriate legislative committee.

"In view of this situation the Committee recommends that the legislative committee having jurisdiction over this agency, the Armed Services Committee, should completely review the legislative background of NACA with a view toward enacting a comprehensive basic law authorizing the various activities and construction programs which it regards as necessary."

That situation was made known to Mr. Vinson.

Mr. Durham. We just authorized specific projects, as I recall it, last year in the Unitary Plan. We did not cover this broad field of operations.

Mr. Smart. That is correct. On the 16th of September at the instruction of Mr. Vinson, I prepared a letter to the

Chairman of the Appropriations Committee telling him that this had been made known to Mr. Vinson and that the Committee would undertake the enactment of appropriate legislation, but that in view of the importance of NACA's program to the national military effort that this Committee would not make any point of order on appropriation language on NACA for 1951.

Now the situation, practically speaking, today is that the NACA has already been before the Appropriations Committee and has offered all of its justifications, so we are coming in rather belatedly, but nevertheless writing on the statute books for the first time broad authorization language for the NACA. That is the reason for this bill here today.

Mr. Elston. If this bill were not in action there is also the possibility that any member of the House could get up on the floor and make a point against the appropriations.

Mr. Hunsaker. May I state that my colleagues appreciate the action you have described which in their opinion has saved us possibly a year in getting on with what we have to do. A year's delay at this time would be very dangerous, I think.

Could I introduce Dr. Dryden now, sir?

Mr. Durham. Thank you very much.

STATEMENT OF H. L. DRYDEN, DIRECTOR
NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS

Dr. Dryden. Mr. Chairman, I thought, if you approve, it would be worthwhile to try to describe to you the relation of

NACA's work to aeronautical development by two or three examples. I think I can do that in a comparatively short time with a few charts, and if you will permit me, I would like to proceed along that line.

Mr. Durham. I think this Committee is fairly familiar with it, Doctor, but I think in view of the fact it is not so familiar with the details that it might be well for the record.

Dr. Dryden. I will make it very short and show you some pictures. The first problem I wish to speak about is the one of icing on aircraft, ^{a problem} which is of concern to both military and civilian aircraft.

This is a photograph of a wing of a transport airplane, a DC-3 that landed in Seattle in 1947. It was lucky to get in, because the pilot was almost blind because of ice on his windshield.

This photograph shows a typical formation of ice and snow on the leading edge of the wing. That has very serious consequences on the airplane because of the weight of the ice, and it is even more serious because ^{the ice} ~~it~~ distorts the shape of the wing and reduces the lift so that the airplane has a hard time staying aloft.

This next photograph is the airplane in which many of you have ridden, the DC-6, which is protected against icing by using the heat from the engines to heat the leading edges of the wing and of the control surfaces. ^{Heat} ~~There~~ is also ~~heating~~

applied to the windshields. With this airplane it is possible to fly practically continuously in conditions of light and moderate icing, so much so that this airplane can fly under many conditions in which other airplanes ^{not so equipped} are not able to fly.

NACA did not design this airplane. It did not design this particular ~~detail~~ system, but it had ~~a~~ ^{with} ~~awful~~ lot to do with protecting airplanes against ice and ^{with} the developments which led up to this particular system, so much so that the Collier Trophy was awarded to one of our men because of his work.

I want to show you a few of the steps where we came into this picture. What did NACA do? Well, in an early report in 1929 some of our pilots at Langley Field reported that airplanes had disappeared on flights in the North, and it was suspected that maybe it was due to icing, and they began a study of the ice problem.

One of the things which they did is illustrated here. They put up a piece of pipe out in front of a little section of wing mounted on ~~the~~ airplane. By squirting water from this pipe and flying high in the air where it is cold, they could study the ice formations which ^{were} ~~resulted~~ on this wing.

They also arranged, as you see from this piece of pipe a boiler to use the heating ~~from~~ from the engine to heat the leading edge of the wing. They were able to show back as far as 1931 when these tests were made that you could prevent the formation

of ice on the leading edge of the wing by heating it. There was enough heat in the exhaust of the engine to do that.

Along with this, about this time there were many proposals for solution. ^{of the icing problem.} The earliest ones were ~~some~~ magic pastes ^{which} you could smear on the wing or ~~some~~ chemicals that would be applied to prevent the ice from sticking, ~~and~~ In order to study the effectiveness of some of those pastes conveniently this little device was set up (indicating.)

It is a piece of pipe connected to a fan. ^{The fan provided} There was a small air stream ^{in which were placed} ~~and~~ arrangements for spraying water ahead of a little wing so it could be found out whether any of these pastes were any good. There were also experiments made in flight.

I might say that no paste has been found which has more than very limited effectiveness. The rain and snow soon wipe it off the wing anyway.

This is a somewhat larger wind tunnel, ^(indicating) a so-called ice tunnel which was built at Langley Field in the mid 30's. Again there was a water spray and ^{the wing} ~~this~~ problem was studied in ^{this} ~~that~~ particular piece of equipment.

We then went into a flying laboratory of this type. This is a C-46 airplane. It had a ^{short length} ~~little piece~~ of wing mounted on top ~~and then~~ Without going into all of the details there ^{were} ~~are~~ the instruments for determining the performance at various places.

This airplane also was protected against icing at all of the vulnerable parts, and as a matter of fact this airplane was able to fly under conditions where the commercial airlines were unable to fly. ^{It often} ~~They also~~ surprised people, ^{at airports,} ~~therefore~~, by coming in under conditions when all the other airplanes were on the ground.

This photograph is just a nice picture of the airplane in flight. It is just put in to give you a better view of ^{the} that flying laboratory.

These experiments ^{of results} were applied to a B-17 airplane. This picture shows where the heating stops, ^{thermal deicing system for the} ~~This was just the~~ ^{near the wing tip.} ~~collection of ice~~ result of a flight in icing clouds. The tip where there was no protection has the ice accumulating. The part that was protected has none. This method of protection was applied to a number of airplanes. This is a B-17 (indicating).

During the war a number of B-24's were protected by this system. ^{pictures show} ~~These are~~ the two experimental airplanes used by NACA, the Lockheed 12 and the C-46 which I have referred to before. One thousand of the modified B-24's saw service during the war.

Now this problem, of course, does not stop with the wings. ^{Here} This is the tunnel built at the Lewis laboratory at the beginning of the war for studies of the icing problem. This ^{photograph} ~~shows~~ a typical experiment on the protection of propellers from icing. ^{It} ~~This~~ gives you some idea of the size of the equipment. This

is a full-scale propeller. The various method of protecting it, which I will not go into, ^{were} ~~can be~~ tried.

Today

Now, of course, an important problem, if we expect our ^{airplanes} jets to operate in the Arctic, is the protection of a jet engine ^{against icing}. A great deal of work is underway to find means of preventing the failure of the engines because of icing. ^{The} ~~That~~ ^{icing} ~~is one~~ problem ~~that~~ has both commercial and military application and our part ~~in the thing~~ is to determine in the case of protection by heating how much heat is required so that the designers can design the ^{system} ~~thing~~ properly.

We also have done a great deal of work on the frequency of icing, and our pilots have done a lot of flying just looking for icing conditions to study the conditions that are likely to be encountered.

to describe

~~Now~~ The second problem I will begin ~~with~~ by showing you this advertisement which appeared last year in Aviation Week. ^{The airplane shown} ~~It~~ is a modified F-34.

Those of you who are familiar with military aeronautics know that we are rapidly approaching the time when radar equipment will be ~~an~~ ^{equipment} essential ~~part~~ and the problem of the designer ^{necessary equipment} is where to put all of these ~~things~~. ~~There has to be~~ guns; ^{it must have} ~~there has to be~~ radar; and the designer has to get air into the engines. The designer has to make a compromise somewhere. This is a ^{development} ~~model~~ of ^{the} ~~an~~ F-34 in which the nose was used for radar. You will notice ^{that} this inlet, this opening on the side,

through which the air was taken to the engine is a development ^{added to the} by NACA.

Our work in a problem of this kind is to determine all of the possible solutions so that a designer can have an opportunity to choose the best solution for his problem.

This work started back in the days when engines were exposed. You remember the old radial engines out in the breeze, and this photograph shows what we had about twenty years ago. We were then interested in speeds up to a couple of hundred miles an hour and this was one of the earliest NACA experiments. This chart shows what happened at the speed of two hundred miles an hour. ~~at~~ ^{Something} over a hundred horsepower ^{was saved} by cowling the engine. This (indicating) is the most that could be accomplished, ~~because of~~ ^{body} the drag of the ~~engine~~ ^{body} without any ~~body~~ ^{engine} at all.

Now we come to a little later ^{period} when the speeds were higher. This shows the development of that particular means of handling air to the engine, ^{that is the purpose of this} The earliest NACA cowlings were ~~bad~~ ^{unsatisfactory at high speed}. The drag went up very ~~badly~~ ^{rapidly} with speed ^{at a speed} of just a little in excess of three hundred miles per hour. Nowadays a modern cowling for propeller-driven airplanes would go up to nearly six hundred miles per hour and the inlet of the same general type designed for jet airplanes will go up nearly to the speed of sound before reaching ^{The} a rapid drag rise. That ^{is the development} ~~is~~ the development of ^{inlets} taking air in at the nose.

The actual ^{overall} development ^{is illustrated} can be shown here. This is the original setup in the propeller research tunnel. I do not know that I have the exact date on it. It was quite some time ago.

These are modern developments of nose inlets. ~~This is the F-2H Banshee~~ ^{This is the F-86, the B-45, and the D-558.}
^{The wing root} ~~This~~ is another place that has been used to take the air in on many airplanes (indicating), on both propeller-driven airplanes and jets. I will not bother you with all of the technical details. We have done work to improve the design of that type of inlet.

This is still another kind with a scoop underneath the airplane, sometimes stuck a little bit away from the body and sometimes close to the body. This is the flush inlet which I first showed you. The development of that ^{type} goes back to 1930 when a scientist was working on the very general problem of taking air in and out through a surface. He just put up a flat piece of plywood, made openings of various shapes and had a ^{fan} ~~sucker~~ by which he could suck air in ^{or} and blow air out. He ^{measured} ~~suffered~~ the pressure losses involved and the effect on the surface.

In 1945 we see this general type of inlet applied to an airplane. Here you see an inlet of a general type ^{the same as that} shown on the F-84 as modified, ^{located in a small air channel, with} a little box underneath, a blower to pull air through it. ^{this} a very small piece of equipment ^{and was} assembled

from a ventilation blower to study in a little more detail the performance of this inlet.

I will not stop on these charts. They show a little bit about how the air ^{flows} ~~blows~~ ^{and into} around the flush inlet. To come back to the ^{chart} ~~thing~~ we started on, the information on which the design and the shape of this boundary, the depth of the inlet, and the shape of this ramp, that information goes back to a program which gave to the designer a lot of information about the pressure losses involved, ^{and} ~~about~~ the drag penalties incurred, if he took the air in in that particular way.

Just to show that the problem continues, we ^{show here later} ~~have put~~ a few airplanes ~~on here~~. Here we have a 1924 airplane with thrust power so low that it hardly shows up on this scale and the speed is very low. Next we have the P-47 in 1944. This one took in 125 cubic feet of air per second; this one (indicating) took in 1900 feet per second; that is the 1950 plane. Now in this next decade the planes will ^{fly at speeds} ~~be~~ beyond ^{the speed of sound} ~~that~~. They will be taking in air at the rate of four thousand cubic feet per second, and the engineer has a tremendous job in getting all of that air in and providing space for guns and radar, ^{He} ~~and he~~ needs ^{obtained by} ~~the~~ basic information for trying all of the schemes so that he may select the scheme appropriate for his design.

That is the part that NACA plays in that particular picture, ^{to} ~~to~~ ^{provide the basic data} ~~to~~

Finally, we ^{will consider} ~~have just~~ a powerplant ^{problem} ~~diagram~~. This ^{chart} ~~shows~~ a jet section in an engine. Here is the compressor, the com-
in cross section.

bustion chamber, the turbine which drives the compressor, and ~~this shows~~ the afterburner where more fuel is injected and burned downstream to give higher thrust.

~~Now we can~~ ^{Let us} look at this combustion chamber for just a moment to ~~show you some~~ ^{consider one} of the problems involved. I might ^{introduce} ~~state~~ ⁱⁿ it this way. In the early jet engines ^{when} in flying at altitude the fire ^{often} went out, as the pilot would say, and he would be compelled then to come to very much lower altitude ^{start the engine} or perhaps even to land, ^{if the engine did not start}.

This problem was very poorly understood and it was limiting the altitude to which airplanes could go. ~~This is the scientific background.~~ ^{This photograph will} It might be better to show you what this combustion is. There is enough heat to heat the Empire State Building in one of these powerplants. That gives you some idea of the heat and the intensity of the flame.

Mr. Durham. Do you mean that the turbojet produces that much heat when it is in operation?

Dr. Dryden. The rate of fuel that you burn in the engine is about the same as you would use to heat the Empire State Building.

This is the airplane in which the problem came up. Now at the beginning of the war the committee built this place of equipment at Lewis Laboratory (indicating). The purpose was to study reciprocating engines at altitudes. When this problem arose with jet engines this laboratory was there to

study the conditions at altitude ^{while the engine and its operators remain} on the ground.

This tunnel is twenty feet in diameter, so it ^{was} ~~is~~ big enough to saw off the tips of the wings and put the whole airplane with the body ^{and get it in the tunnel. The air pressure in} ~~the~~ This tunnel can be reduced by exhausting air from it to reproduce the conditions at very high altitude, so that ^{the} ~~this~~ problem could be studied.

^{Here} ~~This~~ in brief is the type of result. Because this is an open hearing I have put a cover over the altitude scale.

~~This chart is used for another purpose.~~ Here we have shown a candle flame with which you are familiar. If you put ^{the candle} ~~that~~ under a bell jar you will find ^{that the color of the flame} ~~it~~ changes from orange to blue as the ^{pressure} ~~altitude~~ is reduced, and finally it goes out.

This is the combustion chamber of the turbojet engines. You will observe that in operation on the ground it has this orange flame. As it gains altitude ^{the flame} ~~it~~ gets bluer and bluer, and finally ~~it~~ goes out.

These are stills from colored motion pictures, looking end on at such a combustion chamber. They are a succession of ^{frames from} moving pictures. Here at the ground you see all of the ^{frames} flames look alike. ^{The fuel} ~~It~~ is burning ^{steadily} with this bright flame. The combustion efficiency is ninety-nine per cent. As you reduce the altitude the flame becomes blue, and if you notice this carefully, you see there is no flame in this section (indicating) and here there is (indicating).

Mr. Durham. As you reduce the altitude?

Correction. *consequently to*
 Dr. Dryden. As you reduce the pressure ~~by~~ increasing the altitude. As the altitude increases, the combustion becomes slightly irregular. ~~Here you can see another place.~~
 This is much more impressive ^{as} ~~than~~ a movie, of course. As you go still higher you see ^{the flame} ~~it~~ almost goes out during this part of the cycle, and if you go a little higher it does go out.

Now the result of the research is, of course, that the combustion efficiency goes down as the altitude increases. The object of the research is to make our engines operate at a higher and higher altitude. What has been accomplished since this early trouble is represented here.

Since the problem was new and no particular study had been made of it ~~at first~~ it was very easy to make a big gain by the initial efforts. After that progress went a little more slowly, and finally here was another step gained by a change in design. This ^{research} roughly doubles ^{it} the altitude at which our jet engines can operate.

Now our part in this problem ^{was} ~~to~~ to determine what it is that makes the flame ^{sustained by} ~~do that~~, and to ^{improve combustion at all times} ~~make it better~~, and it has been possible to improve conditions as shown by this chart.

Mr. Durham. Your agency of the Government was the only one doing this type of service for airplanes.

Dr. Dryden. We were the only agency that had a piece of equipment in which the conditions at altitude could be repro-

duced on the ground, and we were very fortunate in having that piece of equipment available. It was built to test the altitude effect on reciprocating engines, but it was available in time to bring a rather quick solution, as you can see, to this problem, and it is one of the reasons why we do not like to see another year's delay introduced into the question of providing equipment which ~~will make it~~ ^{is} necessary to deal with the problems which are foreseen.

Mr. Durham. Off the record.

(Remarks off the record.)

Dr. Dryden. This is one of the ^{types} ~~pieces~~ of equipment authorized in the appropriation bill by ^{the procedure} ~~this process~~ which has been described. I think that ^{the} ~~there are~~ three typical problems ^{described} ~~show~~ where we fit in, ^{the development picture} We did not design this engine. We did not design the airplane; but we ^{did} ~~do~~ build up the body of information which enabled the designer to make a better product. When he gets in trouble and discovers ^{problems} ~~things~~ which he did not ^{foresee} ~~expect~~, we attempt to find the solution, to try to help him with the solution to the problems.

Now I think it is important that the Committee understand exactly what the function and the work of the NACA is. I think that you might ^{now} ~~return to~~ ^{a consideration of HR 5074} ~~the bill itself~~, in any way that you would care to proceed from here.

as Dr. Hunsaker said, this piece of legislation simply writes in what the present practice is. We, of course, are very con-

scious of ~~this~~ time element.

Mr. Durham has referred to the Unitary Plan. That authorization was passed at the last session. The initial appropriation of five million dollars cash and fifteen million dollars contract authority is now before the Appropriations Committee. I cannot tell when that will be passed or when work will actually start on that piece of equipment. That program was a special program of very unusual magnitude and came before your Committee for authorization.

Mr. Durham. You have asked for appropriations in the 1950 budget to take care of those items that we authorized last year; is that correct?

Dr. Dryden. Part of them at the rate of five million cash and fifteen million contract authority to go to the end of 1951. That is the amount passed by the Bureau of the Budget and now before the Appropriations Committee.

It is that delay that concerns us. We are perfectly willing to work under any system that the Committee wishes. ^{we wish to} It gives you the opportunity to review everything ^{we} ~~you~~ do, to approve and disapprove. We very much would like to see some system which does not make it necessary to first go through some Congressional action on authorization and wait a year, because it seems to us that that is what it amounts to, before the appropriation legislation goes through.

Mr. Durham. Doctor, what were the items we authorized

last year? Can you give that to us?

Dr. Dryden. ^{the authority has} It was in perfectly general language, you will recall, the way the bill finally passed, for supersonic wind tunnel equipment, ~~and in the hearings you will find two~~ two's, two four's, and two eight-foot tunnels ^{described} ~~talked about~~.

As a result of review by many agencies and our own subcommittee, there is really authorized for beginning construction only one piece of equipment, one of the eight-foot supersonic wind tunnels, and to begin the university program, three and a half million dollars.

Mr. Durham. You are asking for that?

Dr. Dryden. That is before the Appropriations Committee.

Mr. Durham. Then there is one item, a piece of equipment we brought over from Germany.

Dr. Dryden. That is in the Air Force part of the bill. The Air Force secured an appropriation at the last session of Congress for thirty million dollars, I think.

Mr. Elston. Doctor, this legislation in itself does not add to any cost, does it?

Dr. Dryden. It permits us to ask for things in appropriation bills.

Mr. Elston. What I mean is the Appropriations Committee could give you that authority anyhow.

Dr. Dryden. That is the question at issue, as I understand it.

Mr. Elston. This is merely an authorizing piece of legislation, and they still could refuse the appropriation.

Dr. Dryden. They control the money, that is right.

Mr. Elston. So it actually does not add anything to the present cost.

Dr. Dryden. It simply preserves the existing situation which is that we estimate our construction requirements to the Appropriations Committee. They hold hearings and turn them down or approve them.

Mr. Smart. I might say there, Mr. Elston, that Section 1(b) of the Bill, H. R. 5074, anticipates an ultimate expenditure of \$16,500,000. That is for new projects for 1951 for which there had been no prior authorization.

Mr. Elston. Well, the cost of those, of course, has been anticipated.

Mr. Smart. That is a matter before this Committee this morning.

Dr. Dryden. They are pending in the appropriation bill.

Mr. Elston. In other words, the authority for those projects has already been authorized.

Dr. Dryden. If the appropriation bill passes.

Mr. Smart. They make the point that that being new construction it is subject to point of order.

Mr. Elston. There is no question about that. The new construction is already authorized.

Mr. Smart. It is not authorized yet, and they say it is subject to a point of order if it is only included in the ~~authorization~~ ^{appropriation} bill without prior authority from the legislation committee, which is this Committee.

Dr. Dryden. If I might review the matter, Dr. Hunsaker's statement contains this detailed history. In the middle 1920's a point of order was raised in the House against an appropriation for the operation of Langley Laboratory. The point was sustained, but the item was later inserted as a Senate amendment and agreed to in conference without change. To prevent a recurrence, the House Appropriations Committee inserted in a later appropriation bill the language "hereafter to be known as the Langley Memorial Aeronautical Laboratory," and this became law.

Several years later when a point of order was raised against appropriation items that authorized construction without previous legislative authorization, the House Parliamentarian advised, and it was ruled, that the basic legislation establishing the NACA in 1915 provided adequate legislative authority for appropriations for construction.

The language in the organic Act upon which the ruling was based is: "In the event of a laboratory or laboratories, either in whole or in part, being placed under the direction of the Committee, the Committee may direct and conduct research and experiment in aeronautics in such laboratory or laboratories."

Such a point of order was not again raised on the floor of either house until last year, and you have heard the history of that, so it has been made twice but it has not been sustained in the history of the committee for the last thirty-five years.

Mr. Doyle. May I ask this question: In other words, if we pass this bill and it becomes public law then the NACA can go direct thereafter to the Appropriations Committee without the House Armed Services Committee reviewing any of the objectives.

Mr. Smart. It cannot, except for items of new construction, Mr. Doyle. I think I can make the point clearer by stating that the requested authorization by NACA for fiscal 1951 is a total of \$62,600,000. However, there appears to be sufficient authority already on the statute from the basic act to permit NACA to go direct to the Appropriations Committee for all items on salaries and expenses and items of that character. However, the item of \$16,500,000 for new construction for fiscal 1951 is really the meat of this bill for the general language to permit them hereafter to go to the Committee on Appropriations except for new construction items where they must return to this Committee.

Mr. Kelly. In the bill as presented, it would be unnecessary to return to the Committee for new construction items.

Mr. Smart. That is correct, in the bill as presented

here, but I have offered some suggestions for amendments which would require NACA to come back here for any new items of construction.

Mr. Doyle. It would seem to me that the House Armed Services Committee would have jurisdiction over this kind of thing. If it did not, it would take away all opportunity for the House Armed Services Committee to know what is going on in the line of new construction. How would we know?

Mr. Smart. Of course, the Appropriations Committee has taken that exact same stand. They say NACA should acquire broad legislative authority. I think I know the thinking of the members of this Committee well enough, including the Chairman, to know they would require authorization for new construction. I believe that I am on safe ground in anticipating that that is the idea of this Committee.

Mr. Doyle. There is no other way that a member of Congress may be chargeable with the responsibility of being informed if millions can be appropriated without the Committee knowing anything about it.

Dr. Dryden. This may be a little irregular, but may I ask counsel the definition of new construction. For instance, our 1951 budget has in it two major items and several smaller ones. The major one is the modification of one of our wind tunnels for transonic speeds. These are speeds right around the speed of sound.

Mr. Smart. That is the expansion of an existing facility.

Dr. Dryden. It is the modification of an existing facility.

The other items are some money for new utilities. There is one new facility for landing gear studies and some additional exhausters for this altitude wind tunnel I mentioned to go to higher altitudes.

Mr. Smart. Both Mr. Durham and Mr. Elston are on the Joint Atomic Energy Committee and are well aware of the problems there. Now as far as integrity is concerned, I know of no organization that has as high integrity as NACA. They have operated for thirty-five years without general authorizing legislation, and as far as I know I have heard no word of criticism or scandal or anything associated with those words directed at NACA.

When we started out to find what kind of legislation we should have for NACA, NACA being an independent agency of the Government as contrasted with the usual executive agency of the Government, Mr. Kelly and I and the other members of the NACA staff checked some of these independent agencies to see how they were required to operate.

The one which to my mind was perhaps the closest to NACA so far as the nature of its work and the secrecy and items of that kind are concerned is the Atomic Energy Commission. However, we studied NACA, Atomic Energy Commission, the American Battle Monuments Commission, the Veterans Administration, the

Federal Communications Commission, and in all five of those not a single one of them is required to come up and get authorizing legislation from a Congressional legislative committee prior to going before the Appropriations Committee.

Mr. Durham. Perhaps the Resources Planning Board was in very much of the same situation until last year.

Mr. Smart. That is correct.

Mr. Kelly. May I point out, Mr. Smart, that these agencies are the independent agencies which perform their own construction. The items are not handled by the Public Buildings Administration.

Mr. Smart. So there is no uniformity of treatment among the agencies. You have this problem with the Atomic Energy Commission.

Mr. Durham. Well, we always have this problem when we get into this highly technical field.

Dr. Dryden. May I say we have every confidence in the Committee. There is no desire on our part to escape review by the Committee. We are simply concerned by just looking at the record with how long it takes to get an authorization bill through, then wait and get the appropriation bill through before the facilities can be started.

Mr. Durham. You will recall at the last session of Congress the Committee was concerned about being helpful in this matter, and we saw some of the mistakes we had made. We

do not want to be caught again like we were in 1938 and 1939.

Mr. Smart. May I ask one question, please. Dr. Dryden, you have said you have requested three and a half million dollars to implement the ten million dollar authorization for educational wind tunnels.

Dr. Dryden. I said that is the amount the Bureau of the Budget has approved. There is a slight difference.

Mr. Smart. There is a great difference. May I ask you, inasmuch as your original bill provided for an authorization of four million dollars and this Committee raised it to ten million dollars, have you been able to detect any feeling on the part of any of the officials of the government that the ten million dollar authorization of this Committee was too high and that it will not be implemented by an appropriation?

Dr. Dryden. I think the straightforward answer to your question is that in every forum that we have discussed this matter of university wind tunnels, we have met two very divergent groups, one of which has the philosophy, if I might express it that way, of giving to those who are highly qualified, a small number of highly qualified people; the other philosophy, as someone remarked in one of the forums is to cast your bread on the waters, a program of diffusing small equipment widely.

We have asked the Bureau of the Budget for half of the ten million dollars, because we wanted a little experience before we got too far in this matter.

Mr. Durham. Doctor, you know how I felt about it last year. I want to get you independent in these things as fast as we can, and the college level is not just one, two, or three years; it is ten, fifteen, or twenty-five.

Dr. Dryden. The only thing I can say is Dr. Hunsaker and ~~his~~ committee approved our asking the Budget Bureau for half of the amount with the idea of getting a little experience. The Budget Bureau allowed three and a half million dollars.

Mr. Durham. The Committee asked for five million then?

Dr. Dryden. Yes.

Mr. Smart. To pursue the thing a little farther, is it the feeling of the committee that the House Armed Services Committee went too far in authorizing ten million dollars?

Dr. Dryden. The committee as a whole has expressed no view. Some members of the committee have felt that the original amount was perhaps all we would find qualified. The staff frankly does not know yet.

We are in the midst of gathering information about the schools. We will invite them to submit formal proposals as soon as the appropriation passes one house.

Mr. Durham. How many proposals did you have submitted this year?

Dr. Dryden. About sixty so far this year.

Mr. Durham. And I believe you had thirty when you were

before the Committee before.

Dr. Dryden. That is right. These are informal proposals. We have not yet asked for formal proposals.

Mr. Eiston. Well, you do not see any serious objection, do you, to requiring the committee to come before this Committee for new projects?

Dr. Dryden. No, if we can avoid the delay. That is what I have tried to say. There is certainly no intent not to report fully to the Committee, to explain what we have in mind, to accept your advice. We are just bothered by the delay in the past procedure of getting the authorization legislation passed through two houses of Congress before ^{we} you can submit the ^{recommendations} appropriations. You see, for example, this year I think our appropriation hearings were held in January. It was just after Congress convened, I believe.

Mr. Durham. I do not think you will experience any difficulty with this Committee on national defense items, which, of course this has a direct bearing to.

Dr. Dryden. I am not sure that you can prosecute them simultaneously through the same session. Your experience is much better than mine.

Mr. Durham. We did that last year on the wind tunnels for the Air Corps.

Mr. Smart. I would have this feeling about that, Mr. Chairman; in all probability the bill will say for fiscal

1952. We may not even have any bill, and if we do it will probably be as an overall matter a small portion of the NACA operation. I think it would be acceptable so long as the Committee understands the needs of NACA and the fact that they have already cleared the Bureau of the Budget and are ready to go to the Appropriations Committee early in January so the matter would have to be expedited and gotten out of here.

Mr. Durham. Any further questions, Mr. Doyle?

Mr. Doyle. No.

Mr. Elston. No.

Mr. Smart. I would suggest at this point that the Committee direct its attention to the Bill with certain suggestions I have to offer and certain additions which I would like to make.

Mr. Durham. We will read the Bill. You suggest the additions.

Mr. Smart. I would further suggest that Mr. Ulmer, the fiscal director for NACA and perhaps Mr. Kelly, who are those most acquainted with the legal phraseology of the Bill, sit up around the table here.

Beginning on the first page with Section 1, after the enacting clause: "That within the limits of appropriations now or hereafter available to the National Advisory Committee for Aeronautics said Committee is hereby authorized--"

Now the first point I wish to raise there is this: I have suggested that they strike out the words "within the limits of appropriations now or hereafter available" and on line 5 strike out the words "said Committee." That would make the first part read "That the National Advisory Committee for Aeronautics is hereby authorized--"

I would like to ask the NACA representatives what their objection would be to that.

Mr. Elston. That language is merely surplussage, is it not?

Mr. Smart. That is the way it seemed to me. It was written in there in the anticipation that in the future NACA would not have to come before this Committee.

Mr. Victory. Mr. Chairman, this goes to the heart of our desire to save time. I would like to see your Committee, if it is possible, work out a plan by which we could pursue our request before the Congress simultaneously with our legislation in the interest of the country in these troubled days. I know you gentlemen want to see this science of aeronautics advanced as rapidly as possible.

Heretofore we have been able to go direct to the Appropriations Committee and with only a single year's delay get money and get going on new ideas. I frankly fear that with this proposed amendment there will in most cases be a delay of a year in the normal securing of appropriation authority to proceed

with the work. Now that objective is not what we want, and I feel it is not what you want.

I do not know how to accomplish what I am trying to ask for. It may be possible. I admit it is a new idea. I would like to see your Committee try to work out some means by which we could legally submit an estimate for appropriation at the same time we had the idea and not wait for legislation to be fully enacted into law.

There may be no precedent for this, Mr. Chairman, but it is a good idea, because it is in the national interest. Otherwise, we are handicapping ourselves by our democratic processes to the extent of a year.

Mr. Smart. I could only suggest the only alternative to that that I know of. On occasions we will have very soon before the Judiciary Committee a plan to recodify all of the laws relating to the Army, Navy, Air Force, Marine Corps, and Coast Guard. The Judiciary Committee is the appropriate committee to entertain that legislation. However, they feel that the House Armed Services Committee has such an abiding interest in the subject matter and the laws regarding the service that they will request Mr. Vinson to appoint a subcommittee to sit with them while the legislation is being entertained. That would be an appropriate recognition of our Committee's interest in it and probably meet all of the questions.

Now if it might be possible to work this thing out on the basis of having a representative of the Armed Services Committee sit with the Committee on Appropriations at the time this thing is worked out, perhaps we could do that. I merely suggest that as one of the things being done today.

Mr. Hunsaker. Could I inject that would be very satisfactory if it were possible.

Mr. Durham. Off the record.

(Remarks off the record.)

Mr. Durham. It looks like you know the situation twelve months in advance.

Dr. Dryden. Not twelve months.

Mr. Durham. Well, six months, we will say. You have to get it into the appropriations in advance. Now the Appropriations Committee is not in session taking action. I do not know of a single piece of legislation in my long experience with the services which we have not expedited for appropriations, and a lot of times were faster than they were. I just do not recall anything that seriously hampered the national defense.

Mr. Elston. I do not think this is a case where the Committee does not trust NACA to go ahead, but if the committees are going to constantly delegate their power over legislative matters to the Appropriations Committee the Appropriations Committee finally becomes a very powerful committee, and it has been the policy all along not to delegate any more power

than is necessary.

Atomic Energy delegates almost all of its power to Appropriations, and it is working very poorly. They can go ahead with projects costing millions of dollars without coming to the Atomic Energy Committee and getting authority. You would not do anything like that, but it is just a matter of policy.

Mr. Victory. Might I say something off the record, Mr. Chairman?

Mr. Durham. Off the record.

(Remarks off the record.)

Mr. Durham. The Committee feels very strongly on this question. The Navy has to report every item to us. There would be no objection, as I hear it from them today. If you do not do that, the Army has no regulation and neither has the Air Corps.

The Committee feels that all of this is in the interest of national defense, and it feels very strongly that it should have knowledge of these things and these programs initially for that purpose. We have a pretty heavy responsibility if we do not fall down on these things.

Your suggestion might have the possibility of delaying, because if you were to submit an item the Committee would not, of course, okay the item without at least opening a hearing on it, which we would have to do in the interest of the public and everybody else. We could not get around that.

If you just submit the item to us and then we have to approve it I think probably it would delay the matter, instead of throwing the thing in here and telling us what you want and we can go at it.

Mr. Victory. I am not going to argue the matter. I just suggested that perhaps it might save time, possibly even a year.

Mr. Durham. During the war we just put a limitation on the amount of the new construction. I do not recall the amount, but we operated under that in some of the defense matters.

Mr. Smart. It was \$478,000,000, wasn't it?

Mr. Doyle. May I make this observation, Mr. Chairman. I think there is another angle you distinguished scientists should bear in mind. The people that are paying the bill that amounts to so much of our tax dollars expect our elected representatives to know what is going on with that money. There is no effort to delay you, but on the other hand I think it is necessary for our national defense that we elected men know what is going on, why the money is being asked for, and what it is spent for, and on that basis I would be sorry to see such a departure, because I do not think it would give you strength in the ultimate. I think it would give you weakness, if we men go home to our districts and say we never heard of it, which would be the case if you had authority carte blanche to go to the Appropriations Committee. We would not know about

it until it came to the floor.

Mr. Victory. My suggestion was that we bring it to your attention when the Congress convenes.

Mr. Doyle. But we would have to have hearings.

Mr. Durham. You mentioned this specific item of legislative and educational programs. I think we can go in the House and discuss this matter very intelligently with the Appropriations Committee which would be helpful to you people, which is what I am pointing out to you.

Mr. Smart. Mr. Victory makes the point of a year's delay. I would like to ask him if NACA presented its new construction needs in an authorization bill of this Committee which would be heard and reported to the House and passed by the House in the month of January, would that effect a one-year delay?

Mr. Victory. As I understand it, we need to have an actual act of Congress before we can submit an estimate to the Bureau of the Budget for money. It would have to clear. Do you mean the action of the House Committee is enough to justify the Bureau of the Budget in submitting an estimate?

Mr. Smart. Of course, each year so far as new construction is concerned what you do is clear that with the Bureau of the Budget. As far as the salaries and things of that nature are concerned, you do not have to come back here.

Now the Army and Air Force and all of these agencies have to come in here every year, and, of course, they do not like

it any better than you, because they are not getting theirs as fast as you are getting yours, but they have to come back each year.

Now I do not see why it is necessary, if some basic legislation is constructed here so far as construction for fiscal 1952, if you got such a bill which in my opinion would be a short one, in here by January, and we reported it out and passed it through the Congress, that does not stop you from going to the Bureau of the Budget and justifying your request for 1952.

Mr. Victory. Mr. Chairman, I would be entirely content with counsel's suggestion. I had such a regard for the burden on your Committee that I did not think it would be possible for us to get consideration in January. I thought that all of the military agencies would carry so much more weight with your busy Committee that you would not get around to hearing us until the end of the session. That is why I thought a year's delay would ensue.

Mr. Elston. We never get through with them.

Mr. Smart. I might say to Mr. Victory that if they get a proposal in Congress in January, they will beat by two months anything the military can do.

Mr. Victory. Mr. Chairman, I will cheerfully go along with that. I did not realize that. I thought you were too busy to recognize our small agency that way.

Mr. Elston. Congress can move awfully fast, and on some

things they move very slowly.

Mr. Victory. With that understanding we interject no objection.

Mr. Durham. Continue to read.

Mr. Smart. Subsection (a) "to equip, maintain, and operate offices, laboratories, and research stations under its direction." There, Mr. Chairman, I think it would be well for the record to have a breakdown of all of the money NACA is requesting for 1951, a total of \$62,600,000, and of that \$46,100,000 is for the salaries and overhead expenses and operation, the scientists and people of that character, and their materials.

Mr. Durham. Without objection it will go into the record at this point.

(The document referred to is as follows:)

Mr. Elston. Do you think that language is broad enough to cover everything you have in mind?

Mr. Victory. I think it is, sir.

Mr. Ulmer. It covers all of our present operations, sir, and any new operations would come up for authorization anyway.

Mr. Smart. Now Subsection (b) relates to new construction for fiscal 1951, \$16,500,000. I have suggested that we strike out the words "when specified in appropriation Acts" because if they are coming for an authorization here, it will be specified in that act.

Mr. Elston. If you leave that language in, it would look as though you would have to go to the Appropriation Committee first.

Mr. Smart. Yes, and as a matter of form the authorization would precede the appropriation. So it would read "to acquire additional land for, undertake additional construction at, and purchase and install additional equipment for, existing laboratories and research stations under its direction; and"

Mr. Victory. No objection.

Mr. Durham. Very well, continue.

Mr. Smart. I suggest no change in Subsection (c), "to purchase and maintain cafeteria equipment."

Mr. Durham. Is this necessary, Doctor?

Mr. Victory. It is considered important to the extent that the Appropriations Committee has wished to continue it

and drop all surplussage.

Mr. Durham. If there is no objection, Section 1 as amended will stand approved.

Mr. Smart. "Section 2. Notwithstanding any other provision of law, the National Military Establishment--" and there I suggest we substitute the words "the Department of Defense" for "the National Military Establishment." You will recall this bill was introduced before the name was changed. This bill was a hangover from the first session.

Mr. Victory. I was thinking of the delay which we might encounter again.

Mr. Smart. I will remind you that in the last session of Congress they passed a \$210,000,000 bill through both houses and had it signed by the President in one week.

So, continuing "or any component thereof is authorized to transfer supplies, equipment, aircraft, and aircraft parts to the Committee without reimbursement."

Mr. Durham. Is there any objection? Is that agreeable with the air services?

Mr. Ulmer. I do not think that any of their representatives are here, but it has been approved by them.

Mr. Smart. Very well, I will continue. "Provided, that such transfers shall be reported by the Committee to the Director of the Bureau of the Budget in accordance with regulations prescribed by him: Provided further, that this section shall not

be construed as authorizing the transfer of administrative supplies or equipment: and provided further, that this section shall not be construed as prohibiting the loan of items of any sort to the Committee."

Mr. Durham. Well, that is where I think you are going to get into some delay, right there. You have a long clearance there to get an airplane over there for a deicing project in two or three days' time.

Mr. Smart. That would be a practical delay, and not a statutory delay.

Mr. Durham. All right, without objection Section 2 as amended is approved.

Mr. Smart. "Section 3. Statutory provisions prohibiting the payment of compensation to aliens shall not apply to any persons whose employment by the Committee is determined to be necessary."

As was previously pointed out, they have had this authority in previous appropriation Acts.

Mr. Hunsaker. It does not say who this is to be determined by. I would like it to say that it be determined by the Committee.

Mr. Victory. We could just transpose the phrase "by the Committee is determined" to "is determined by the Committee."

Mr. Hunsaker. We do not want to delegate that authority to the staff.

Mr. Smart. It will read "Statutory provisions prohibiting the payment of compensation to aliens shall not apply to any persons whose employment is determined by the Committee to be necessary."

Mr. Durham. All right, Section 3 is approved.

Mr. Smart. "Section 4. Section 1, paragraph (b), subparagraph (3), of the Act entitled "An Act to promote the national defense by increasing the membership of the National Advisory Committee for Aeronautics, and for other purposes", approved May 25, 1948 is hereby amended by striking out the words 'Flight Propulsion Research Laboratory' and by substituting in lieu thereof the words 'Lewis Flight Propulsion Laboratory.'"

I might state, Mr. Chairman, there has been no explanation as to the reason for that change. I know what it is, but I think it ought to be in the record.

Mr. Victory. Mr. Chairman, this laboratory was previously known as the Flight Propulsion Research Laboratory.

Mr. Durham. Where is it?

Mr. Victory. Cleveland, Ohio. It was named in honor of George W. Lewis, our director of aeronautic research who for twenty-five years directed aeronautical research in America and who was the man most responsible for America's leadership in the advancement of aeronautical science in this country. Our committee after his death unanimously voted to name the

laboratory in his honor, and we would like to have the approval of the Congress so when we refer to it in the future as the Lewis Flight Propulsion Laboratory we are referring to something that is approved by law.

Mr. Elston. That is located in Cleveland?

Mr. Victory. Yes.

Mr. Elston. You are not changing the address and taking it out of Ohio.

Mr. Victory. No, we are just changing the name. It did not have a name before.

Mr. Smart. Now I have suggested three more sections which I would like to read. One is general authorizing language which would be a new Section 5, as follows: "There is hereby authorized to be appropriated out of any money in the treasury not otherwise appropriated such sums of money as may be necessary for the purposes of Section 1(b) of this Act, but not to exceed \$16,500,000."

That encompasses the new construction projects for 1951, and I would like the representatives of NACA to state if they have any objection to that language.

Mr. Victory. No objection, Mr. Chairman.

Mr. Durham. Section 4 as read is approved without objection, and Section 5, which is a new section, is approved without objection.

Mr. Smart. Next I would suggest a new Section 6: "Appro-

priations made to carry out the purposes of this Act shall be available for expenses incident to construction including administrative, overhead, planning, and surveys, and shall be available until expended when specifically provided in the appropriation Act."

That is for this reason: when they undertake a program of construction they never implement it all by appropriations in any given year, and I think certainly when you give them the authorization and the appropriations to implement that they ought to be permitted to go ahead and carry out their program as a statutory matter and not have to wonder if their program is going to be constantly disrupted. That was my intention in preparing this, and it certainly is in conformance with all of the bills that we have.

Mr. Victory. No objection.

Mr. Durham. Very well, Section 6 is approved without objection.

Mr. Smart. "Section 7. Any projects authorized hereunder may be prosecuted under direct appropriations or authority to enter into contracts in lieu of such appropriations."

That anticipates if they go before the Appropriations Committee and they do not give them the money that they can do it by contract authority in lieu of that.

Mr. Durham. You do not have that authority at the present time.

Mr. Smart. They can get it from time to time, but this would be an authorization and would be a statute for it, and they would not have to come back here to get it.

Mr. Durham. That is regular procedure.

Mr. Smart. It is regular procedure and would clarify the procedure as far as I am concerned.

Mr. Victory. No objection.

Mr. Durham. Without objection, the bill is accepted as read and approved and reported to the full Committee.

Mr. Elston. Going back to Section 2, is it contemplated that you might want to make that applicable to any other department other than the Department of Defense, for example, the Atomic Energy Commission?

Dr. Dryden. We do not contemplate that at present, but it might come up in the future.

Mr. Elston. I can see the possibility that you might want to cooperate with the Atomic Energy Commission in the future if atomic energy is used in airplanes.

Mr. Victory. Mr. Elston, I think that is a good suggestion.

Mr. Elston. I would think, Mr. Chairman, that we might further amend Section 2 by adding after "Department of Defense" "the Atomic Energy Commission" and that would take care of the matter.

Mr. Durham. All right, Section 2 as amended is accepted.

Mr. Smart. They work closely with the Department of Commerce. They have the C. A. A. in here. Do you want to limit it to that, if you are going to expand it, or would you prefer to say "the Department of Defense or any other governmental organization"? This is just an authorization; it is just permissive. That would make Section 2 read "Notwithstanding any other provision of law, the Department of Defense or any other governmental agency or any component thereof" and that would take care of all of the governmental agencies.

Mr. Durham. How about that, Doctor?

Mr. Hunsaker. That would be very helpful, if that could be generalized.

Mr. Durham. Without objection, the amendment as suggested is accepted and approved, and the bill is reported favorably.

Mr. Victory. Mr. Chairman, as the last witness before you, may I express on behalf of the committee our appreciation for your consideration and courtesy toward our needs, and I especially want to compliment counsel for his exceptionally fine study.

Mr. Durham. The Committee stands adjourned.

(Whereupon, at 12:05 o'clock p.m., the Subcommittee was adjourned.)